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Certain Properties of Solutions of Mixed Problems for a Parabolic Equation With Discontinuous Coefficients

where K_1, K_2 do not depend on the coefficients of the equation and f, φ, h_k.

Theorem 5: If u(x,t) is in $\bar{Q}$ a continuous solution of (1) with the homogeneous conditions (17) and (5) ($h_k \equiv 0$) and (4), where F(x) is continuous in Ω, and if (7) ($\varphi \equiv 0$) is satisfied, then everywhere in $\bar{Q}$ it holds

$$|u(x,t)| \leqslant \max_{x \in \bar{\Omega}} |F(x)|.$$

Theorem 6 gives a similar estimation for the solution of (2)-(7). Theorems 7 and 8 treat the continuous dependence of the solution of (2)-(7) on the coefficients of (2) and on the boundary and initial conditions.

The authors mention O.A.Oleynik, R.Vyborny and I.A.Shishmarev. There are 7 references: 6 Soviet and 1 American.

ASSOCIATION: Matematicheskiy institut im V.A.Steklova Akademii nauk SSSR (Mathematical Institute im.V.A.Steklov AS USSR)

PRESENTED: April 12, 1960, by S.L.Sobolev, Academician

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S/199/61/002/003/003/005
B112/B203

AUTHORS: Kamynin, L. I., and Maslenikova, V. N.

TITLE: A maximum principle for parabolic equations with discontinuous coefficients

PERIODICAL: Sibirskiy matematicheskiy zhurnal, v. 2, no. 3, 1961, 384-399

TEXT: The authors study parabolic equations with discontinuous coefficients by O. A. Oleynik's methods. They consider the equation

$$Lu \equiv \sum_{i,j=1}^{n} a_{ij}(x, t)\frac{\partial^2 u}{\partial x_i \partial x_j} + \sum_{i=1}^{n} b_i(x, t)\frac{\partial u}{\partial x_i} + c(x, t)u - \frac{\partial u}{\partial t} = 0, \quad (1)$$

$$\sum_{i,j=1}^{n} a_{ij}(x, t)\lambda_i\lambda_j \geqslant \varkappa \sum_{i=1}^{n} \lambda_i^2, \quad \varkappa = \text{const} > 0, \quad c(x, t) \leqslant 0.$$

in a domain Q which is composed of an n-dimensional domain Ω for the x-variables and the interval (0,T) for the t-variable: $Q = \Omega \cdot (0,T)$. The surface of Q is $\Gamma = S \cdot (0,T)$. Ω is divided into a finite number of

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partial domains $Q_k = \Omega_k \cdot (0,T)$, whose surfaces $\Gamma_k = S_k \cdot (0,T)$ are discontinuity surfaces for the coefficients a_{ij}, b_i, and c. $\Gamma_{kl} = S_{kl} \cdot (0,T)$ are the boundary surfaces common to Γ_k and Γ_l. The authors assume that Γ and Γ_{kl} belong to the Lyapunov surface class. They try to obtain continuous solutions for the following boundary problem:

$$Lu = f(x,t), \quad (x,t) \in Q_k, \qquad (2)$$

$$l(u) \equiv a(x,t) \frac{\partial u}{\partial N} + b(x,t) u|_{\Gamma} = \varphi(x,t), \qquad (3)$$

$$u(x,0) = F(x), \quad x \in \overline{\Omega}, \qquad (4)$$

$$l_{kl}(u) \equiv \alpha_k(x,t) \frac{\partial u}{\partial N_k} + \alpha_l(x,t) \frac{\partial u}{\partial N_l}\Big|_{\Gamma_{kl}} = h_{kl}(x,t), \qquad (5)$$

$$u|_{\Gamma_{kl}-0} = u|_{\Gamma_{kl}+0}, \qquad (6)$$

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$$a(x,0)\frac{\partial F(x)}{\partial N} + b(x,0)F(x) = \varphi(x,0);\ x\in S, \qquad (7)$$

$$\alpha_k(x,t) \geqslant \alpha > 0 \text{ for } (x,t)\in\Gamma_k \qquad (8)$$

$$a(x,t)\geqslant 0,\ b(x,t)\leqslant 0,\ a^2(x,t)+b^2(x,t)>0 \text{ for } (x,t)\in\Gamma. \qquad (9)$$

The authors establish a condition A corresponding to the conditions of theorem 4 of the paper: Boundary estimates for second order parabolic equations and their applications (Math. and Mech. 7, N 5 (1958), 771-791) by A. Friedman. On the basis of this condition, they prove a number of theorems containing solution estimates and respective uniqueness theorems, e.g.: Theorem 1: If condition A is fulfilled, and $u(x,t)$ is a solution of Eq. (1) continuous on $\overline{Q}$, which fulfills the conditions (5,6) as well as $lu|_\Gamma = 0$, $u(x,0) = 0$, then the estimate

$$|u(x,t)| \leqslant \frac{A}{r\alpha} \max_{k,l} \max_{(x,t)\in\Gamma_{kl}} |h_{kl}(x,t)|$$

holds on $\overline{Q}$, where A, r, and α are certain constants. Theorem 2: If condition A is fulfilled, and the functions $f(x,t)$, $F(x)$, $\frac{\partial F(x)}{\partial x_l}$, $\varphi(x,t)$, and $h_{kl}(x,t)$ are continuous on $\overline{Q}, \overline{\Omega}$, Γ, and Γ_{kl}, and satisfy conditions

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(7-9), then the problem (2-6) has not more than one solution function continuous on $\bar{Q}$ and continuously twice differentiable with respect to t on Q_k, which has derivatives with respect to the inner conormals to the boundary surfaces Γ and Γ_k. There are 8 references: 6 Soviet-bloc and 2 non-Soviet-bloc. The most important reference to the English-language publications reads as follows: Nierenberg L., A strong maximum principle for parabolic equations, Comm. on pure and app. math. 6, N 2 (1953), 167-177.

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AUTHOR: Kamynin, L. I.

TITLE: The stability of parabolic difference equations

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 136, no. 6, 1961, 1287-1290

TEXT: In the domain $\bar{G}(0 \leqq x \leqq 1,\ 0 \leqq t \leqq T)$ the author considers the first boundary value problem for a parabolic equation:

$$Lu \equiv \frac{\partial u}{\partial t} - a(x,t)\frac{\partial^2 u}{\partial x^2} - b(x,t)\frac{\partial u}{\partial x} + c(x,t)u = F\left(x,t,u\ \frac{\partial u}{\partial x}\right), \qquad (1)$$

$$u(x,0) = \varphi(x), \quad 0 \leqq x \leqq 1; \qquad (2)$$

$$u(0,t) = u(1,t) = 0, \quad 0 \leqq t \leqq T; \qquad (3)$$

$$a(x,t) \geqq a_0 > 0, \ c(x,t) > 0.$$

Let a, b, c, $\partial a/\partial x$, $\partial a/\partial t$ be continuous in $\bar{G}$; $|a| \leqq A_1$, $|b| \leqq A_2$, $|c| \leqq A_3$, $|\partial a/\partial x| \leqq A_4$, $|\partial a/\partial t| \leqq A_5$.

The differential-difference operator

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$$\bar{R}_h u(x,t) \equiv \frac{\partial u(x,t)}{\partial t} - a(x,t)\, u_{x\bar{x}}(x,t) - b(x,t)u\ (x,t)+c(x,t)u(x,t),$$

is considered on the set

$$D_h: \{(x,t) \in G,\ 0 \leqq t \leqq T,\ x = nh,\ n = 1,2,\dots,\ N-1,\ Nh = 1\}$$

where

$$u_{\bar{x}} = \frac{u(x,t)-u(x-h,t)}{h},\ u_x = \frac{u(x+h,t) - u(x,t)}{h},\ u_{\overset{\circ}{x}} = \frac{1}{2}(u_x + u_{\bar{x}}).$$

Let

$$\|u\|_t^2 = h \sum_{n=1}^{N} u^2(nh,t),\ \|\varphi\|_0^2 = h \sum_{n=1}^{N} \varphi^2(nh).$$

If

$$\left\| \frac{\partial F}{\partial y} \right\| \leqq B_1, \qquad \left| \frac{\partial F}{\partial z} \right| \leqq B_2 \tag{4}$$

is satisfied in G, then for the solution of

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$$\bar{R}_h u(x,t) - F(x,t,u(x,t), u_{\bar{x}}(x,t)) \qquad (5)$$

$$u(x,0) = \varphi(x),\ x = nh,\ n = 0,1,2,\dots, N, \qquad (6)$$

and (3) it holds the energy inequality

$$\|u\|_t^2 + \|u_{\bar{x}}\|_t^2 \leqq c_1\left(\|\varphi\|_0^2 + \|\varphi_{\bar{x}}\|_0^2 + \int_0^t \|F(x, \tau, 0, 0)\|_\tau^2\, d\tau\right).$$

Theorem 1. Let $F(x,t,y,z)$ satisfy (4). Then:
a) the quasilinear differential-difference equation (5) is stable relative to every solution of (5), (6), (3) (in the sense of F. John (Ref. 3: Comm. Pure and Appl. Math., 5, 155 (1952))).

b) If $\partial^2F/\partial y^2$, $\partial^2F/\partial y\,\partial z$ and $\partial^2F/\partial z^2$ are continuous, then there exists a unique solution of (5), (6), (3).

c) If $u(x,t)$ is the solution of (1) - (3) and $\partial u/\partial t$, $\partial u/\partial x$, $\partial^2u/\partial x^2$ uniformly continuous on $\bar{G}$, then

$$\limsup_{h\to 0}\ \sup_{(x,t)\in \bar{D}_h} |u(x,t) - u(x,t;h)| = 0, \qquad (8)$$

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where u(x,t; h) is solution of (5), (6), (3).

d) If u(x,t) in c) possesses uniformly continuous $\partial^2 u/\partial t^2$, $\partial^3 u/\partial x^3$, $\partial^4 u/\partial x^4$ on $\overline{G}$, then

$$\sup_{(x,t)\in \overline{D}_h} | u(x,t) - u(x,t;h) | = O(h^2) . \qquad (9)$$

If

$$|F(x,t,y,z) \leqq f(x,t) + K(|y| + | z|)^{\alpha} \qquad (10)$$

and

$$2C_1(\alpha -1)\, 2^{1+\alpha} (\|\varphi\|_0^2 + \|\varphi_{\overline{x}}\|_0^2 + \int_0^T \| f\|_t^2 dt)^{\alpha -1} K^2 T < 1, \qquad (11)$$

is now satisfied, then for the solution of (5) it holds the inequality

$$\|u\|_t^2 + \|u_{\bar{x}}\|_t^2 \leqq P\left[1 - (\alpha - 1)\, P^{\alpha - 1}\, 2^{1+\alpha} K^2 C_1 t\right]^{1/1-\alpha} \qquad (12),$$

where

$$P = 2C_1\left(\|\varphi\|_0^2 + \|\varphi_{\bar{x}}\|_0^2 + \int_0^T \|f\|_t^2\, dt\right).$$

Theorem 2: If $\varphi(x)$ and $F(x,t,y,z)$ satisfy (12), then (5) is stable for every solution of (5), (6), (3).

Now the author considers on the net $G_h : \{(x,t) \in G,\ x = nh,\ n = 1,2,\ldots,N-1,\ t = mk,\ m = 1,2,\ldots,M\}$ $(1 = Nh,\ T = Mk,\ k/h^2 = \lambda = \text{const})$ the difference equation

$$R_h u(x,t) \equiv u_{\bar{t}}(x,t) - a(x,t)\, u_{x\bar{x}}(x,t) - b(x,t)\, u_x(x,t) + c(x,t)\, u(x,t) = f(x,t) \qquad (13)$$

with the conditions (6) and

$$u(0,t) = u(1,t) = 0,\quad t = mk,\ m = 0, 1, 2, \ldots, M \qquad (14).$$

Theorem 3: a) The linear difference equation (13) is absolutely

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(i.e. for every ratio of the steps in x and t; $\lambda = k/h^2$) stable (in the sense of (Ref.3));

b) on G_h there exists a unique solution of (13), (6), (14);

c) if u(x,t) is the solution of (1) ($F \equiv f(x,t)$)(2), (3), where $\partial u/\partial t$, $\partial u/\partial x$, $\partial^2 u/\partial x^2$ are uniformly continuous on $\bar{G}$, then it holds (9), where D_h is replaced by G_h, u(x,t; h) - - solution of (13), (6), (14);

d) if u(x,t) in c) possesses uniformly continuous $\partial^2 u/\partial t^2$, $\partial^3 u/\partial x^3$, $\partial^4 u/\partial x^4$, then

$$\sup_{(x,t) \in \bar{G}_h} | u(x,t) - u(x,t;\ h) | = O(k + h^2) . \qquad (15)$$

Theorem 4: Let F(x,t,y,z) satisfy (4). Then

a) (16) is absolutely stable for every solution of (16), (6), (13) (in the same sense as in theorem 1);

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b) if there exist continuous $\partial^2 F/\partial y^2$, $\partial^2 F/\partial y \partial z$, $\partial^2 F/\partial z^2$, then there exists a unique solution of (16), (6), (14).

The conclusions c) and d) of theorem 1 hold, where D_h is to be replaced by G_h and (9) by (15).

There is 1 Soviet-bloc reference and 6 non-Soviet-bloc references. The four references to English-language publications read as follows: P.D. Lax, R.D. Richtmyer, Comm. Pure and Appl. Math., 9, 267 (1956); F. John, Comm. Pure and Appl. Math., 5, 155 (1952); M. Lees, J. Soc. Industr. and Appl. Math., 7, No.2, 167 (1959); M. Lees, Trans. Am. Math. Soc., 94 , No. 1, 58 (1960).

ASSOCIATION: Moskovskiy gosudarstvennyy universitet imeni M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

PRESENTED: September 16, 1960, by S. L. Sobolev, Academician

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Card 7/7

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C111/C222

16,3500

AUTHORS: Kamynin, L.I., and Maslennikova, V.N.

TITLE: The solution of the first boundary problem in the large for a quasilinear parabolic equation

PERIODICAL: Akademiya nauk SSSR. Doklady, vol.137, no.5, 1961, 1049-1052

TEXT: The authors consider the first boundary value problem for the quasilinear parabolic equation

$$Lu \equiv \sum_{i,j=1}^{n} a_{ij}(x,t)\frac{\partial^2 u}{\partial x_i \partial x_j} + \sum_{i=1}^{n} b_i(x,t,u)\frac{\partial u}{\partial x_i} - \frac{\partial u}{\partial t} = f(x,t,u,\nabla u), \quad (1)$$

where $\nabla u = (\partial u/\partial x_1, \partial u/\partial x_2, \ldots, \partial u/\partial x_n)$ in non-cylindrical regions D.

The authors consider the existence and uniqueness of the solution in the large.

Let D be an (n+1)-dimensional region of the $(x_1, x_2, \ldots x_n; t) = (x,t)$ bounded by $t = 0$, $t = T > 0$ and a closed surface S. Let $\Omega = \overline{D} \cap \{t=0\}$; $\Gamma = S \cup \Omega$. The authors introduce the norms

$$|v|_0^D = \sup_{(x,t)\in D} |v(x,t)|, \quad |v|_\alpha^D = |v|_0^D + H_\alpha^D[v],$$

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$$H_{\alpha}^{D}[v] = \sup_{P_1, P_2 \in D} \frac{|v(P_1)-v(P_2)|}{[d(P_1,P_2)]^{\alpha}},$$

where the distance between $P_1(\bar{x}_1, \bar{x}_2, \ldots, \bar{x}_n; \bar{t})$ and $P_2(\bar{\bar{x}}_1, \bar{\bar{x}}_2, \ldots, \bar{\bar{x}}_n; \bar{\bar{t}})$ is given by

$$d(P_1,P_2) = \Big(\sum_{i=1}^{n} (\bar{x}_i - \bar{\bar{x}}_i)^2 + |\bar{t} - \bar{\bar{t}}|\Big)^{1/2}. \qquad (2)$$

Furthermore let

$$|v|_{1+\alpha}^{D} = |v|_{\alpha}^{D} + \sum_{i=1}^{n} \left|\frac{\partial v}{\partial x_i}\right|_{\alpha}^{D},$$

$$|v|_{2+\alpha}^{D} = |v|_{1+\alpha}^{D} + \sum_{i=1}^{n} \left|\frac{\partial v}{\partial x_i}\right|_{1+\alpha}^{D} + \left|\frac{\partial v}{\partial t}\right|_{\alpha}^{D}.$$

I. It is assumed that S can be covered by a finite number of spheres W_j so that the piece S_j of S obtained in W_j, for a certain i admits the representation

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$$x_i = h(x_1, x_2, \ldots, x_{i-1}, x_{i+1}, \ldots, x_n; t)$$

$$(x_1, x_2, \ldots, x_{i-1}, x_{i+1}, \ldots, x_n, t) \in \Sigma_j,$$

where h on Σ_j has two first derivatives with respect to x_k and one derivative with respect to t which satisfy the Hölder condition with the distance (2) and $0 < \alpha < 1$; furthermore $\partial h/\partial x_k$ on Σ_j satisfies the Lipschitz condition with the ordinary distance

$$\varrho(P_1, P_2) = \Big(\sum_{i=1}^{n}(\bar{x}_i - \bar{\bar{x}}_i)^2 + (\bar{t} - \bar{\bar{t}})^2\Big)^{1/2}. \qquad (3)$$

For $(x,t) \in \bar{D}$ let

$$\sum_{i,j=1}^{n} a_{ij}(x,t)\lambda_i \lambda_j \geqslant a_0 \sum_{i=1}^{n} \lambda_i^2 . \qquad (4)$$

Let

II. for all $(x,t) \in \bar{D}$, $|u| < \infty$, $\partial f(x,t,u,0)/\partial u \geqslant b_0$;

III. in $(x,t) \in \bar{D}$, $|w| < \infty$ $\left(|w|^2 = \sum_{i=1}^{n} w_i^2\right)$ and $|u| \le K \equiv \left(\sup_{\Gamma}|\psi| + \frac{\sup|f(x,t,0,0)|}{b_0 + \gamma}\right)e^{\gamma T}$

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($\gamma > 0$, $\gamma + b_0 > 0$, $\gamma =$ const) let

$$|a_{ij}(x,t) - a_{ij}(\bar{x},\bar{t})| \leq A_1 [d(P_1,P_2)]^{\alpha} \quad (5)$$

$$|b_i(x,t,u) - b_i(\bar{x},\bar{t},u)| \leqslant B_1 [d(P_1,P_2)]^{\alpha} + B_2 |u - \bar{u}|^{\beta}, \quad (6)$$

$$|f(x,t,0,0) - f(\bar{x},\bar{t},0,0)| \leqslant C_1 [d(P_1,P_2)]^{\alpha},$$

$$\left|\frac{\partial f(x,t,u,0)}{\partial u} - \frac{\partial f(\bar{x},\bar{t},\bar{u},0)}{\partial u}\right| \leqslant C_2 [d(P_1,P_2)]^{\alpha} + C_3 |u - u|^{\beta}; \quad (7)$$

$$\left|\frac{\partial f(x,t,u,w)}{\partial w_i}\right| \leqslant C_4 \quad (i = 1, 2, \ldots, n);$$

$$\left|\frac{\partial f(x,t,u,w)}{\partial w_i} - \frac{\partial f(\bar{x},\bar{t},\bar{u},\bar{w})}{\partial w_i}\right| \leqslant D_1 [d(P_1,P_2)]^{\alpha} +$$

$$+ D_2 |u - \bar{u}|^{\beta} + D_3 \Big[\sum_{l=1}^{n} (w_l - \bar{w}_l)^2\Big]^{\beta/2} \quad (i = 1, 2, \ldots, n), \quad (8)$$

where $0 < \alpha < 1$, $0 < \beta \leqslant 1$.

IV. On Σ_j the $a_{ij}(x,t)$ satisfy in (x,t) the Lipschitz condition with the distance (3).

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V. Let in $\overline{D}$ exist a function $\Psi(x,t)$ which on Γ agrees with the given boundary function $\psi(x,t)$ and for which $|\Psi|^{D}_{2+\alpha} < \infty$.

Theorem 1: If S, the coefficients of (1) and (x,t) satisfy all conditions $(4)_{\pm}$ I-V, then there exists a solution u(x,t) of (1) continuous in $\overline{D}$, and

$$u|_{\Gamma} = \psi(x,t), \qquad (9)$$

where exist constants M and λ $(0 < \lambda \leq \alpha\beta < 1)$ so that in $\overline{D}$ it holds

$$|u|^{D}_{2+\lambda} \leq M(|f(x,t,0,0)|_{\alpha} + |\Psi|_{2+\alpha}), \qquad (10)$$

where M depends on $D, S, \alpha, \beta, \lambda, K, a_0 A_1, B_1, B_2, C_1, C_2, C_3, C_4, D_1, D_2, D_3$.

Theorem 2 is due to A.Friedman (Ref.1: J.Math. and Mech., 9, no.4, 539 (1960)).

For $\beta = 1$ from theorem 2 there follows the uniqueness of the solution the existance of which was proved in theorem 1.

Theorem 3: Let S be an arbitrary closed surface. Let the quasilinear operator

$$\Lambda u \equiv \sum_{i,j=1}^{n} a_{ij}(x,t,u,\nabla u) \frac{\partial^2 u}{\partial x_i \partial x_j} - \frac{\partial u}{\partial t}$$

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be parabolic in $\overline{D}$, i.e. for $(x,t) \in \overline{D}$ let

$$\sum_{i,j=1}^{n} a_{ij}(x,t,u,w)\lambda_i\lambda_j \geq a(u,w)\sum_{i=1}^{n}\lambda_i^2 , \qquad (11)$$

where $a(u,w) > 0$ is a non-increasing function of $(|u|+|w|)$ for $(|u|+|w|) < \infty$.

If $a_{ij}(x,t,u,w)$ and $f(x,t,u,w)$ are locally continuous in u in the sense of Lipschitz then there exists at most one solution of the first boundary value problem for

$$\Lambda u \equiv f(x,t,u,\nabla u) \qquad (12)$$

with the boundary condition (9), which is continuous in $\overline{D}$ and has there bounded derivatives $\partial u/\partial x_i$, $\partial^2 u/\partial x_i \partial x_j$ $(i,j=1,2,\ldots,n)$.

Lemma: If $f(x,t,u,w)$ is continuous in all arguments and if for $|u| < \infty$

$$|f(x,t,u,0)| \leq C_5 + C_6|u|, \qquad (13)$$

then for every solution of (12),(9) continuous in $\overline{D}$ (where Λ of (12) has continuous coefficients a_{ij} and satisfies (11)) there holds the a priori

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estimation

$$\sup_{\overline{D}} |u(x,t)| \leq K_1 \equiv (\sup_{\Gamma} |\psi| + \frac{C_5}{\gamma - C_6}) e^{\gamma T} \qquad (14)$$

($\gamma > 0$ arbitrary so that $\gamma - C_6 > 0$).

Theorem 4: Let S satisfy I; let $\psi(x,t)$ satisfy V; let $a_{ij}(x,t)$ satisfy (4),(5) and IV. Let (13) be satisfied for all $|u| < \infty$. In $(x,t) \in \overline{D}$, $|w| < \infty$, $|u| \leq K_1$ (K_1 from (14)), let (6),(8) and

$$|f(x,t,u,0) - f(\overline{x},\overline{t},\overline{u},0)| \leq C_7 [d(P_1,P_2)]^{\alpha} + C_8 |u - \overline{u}|^{\beta}$$

be satisfied. For $\partial f(x,t,u,w)/\partial w_i$ it holds (7). Then there exists a solution $u(x,t)$ of (1),(9) continuous in $\overline{D}$, for which it holds (10), where M depends on $D, S, \alpha, \beta, \lambda, A_1, B_1, B_2, C_4, C_5, C_6, C_7, C_8, D_1, D_2, D_3$.

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There are 2 non-Soviet-bloc references. The two references to English-laguage publications read as follows: A.Friedman, J.Math.and Mech.,9, no.4,539(1960). A.Friedman, J.Math.and Mech.,7,no.5,771 (1958).

ASSOCIATION: Matematicheskiy institut im.V.A.Steklova Akademii nauk SSSR (Mathematical Institute im.V.A.Steklov AS USSR)

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16,3500

AUTHOR: Kamynin, L.I.

TITLE: On the solution of boundary value problems in the case of parabolic equations with discontinuous coefficients

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 139, no. 5, 1961, 1048 - 1051

TEXT: The author proves the existence of the solutions of the I., II. and III. boundary value problem for parabolic equations with discontinuous coefficients (with a spatial coordinate) the lines of discontinuity of which satisfy only the Hölder condition with the exponent $> {}^1/2$. The existence of the mentioned solutions is proved at first for the exceptional case

$$a_i^2 \frac{\partial^2 u_i}{\partial x^2} = \frac{\partial u_i}{\partial t} + f_i(x,t) \qquad (i = 1,2) \tag{12}$$

then for

$$a_i^2 \frac{\partial^2 u_i}{\partial x^2} = \frac{\partial u_i}{\partial t} + b_i(x,t)\frac{\partial u_i}{\partial x} + c_i(x,t)u_i + f_i(x,t) \quad (i=1,2) \tag{14}$$

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and finally for the general case

$$a_i(x,t)\frac{\partial^2 u_i}{\partial x^2} = \frac{\partial u_i}{\partial t} + b_i(x,t)\frac{\partial u_i}{\partial x} + c_i(x,t)u_i + f_i(x,t) \quad (i=1,2). \quad (2)$$

The equation (2) is considered in the regions $S_T^{(i)} = \{(x,t)\ ;\ X_j(t) < x < X_{j+1}(t)\ ;\ 0 < t < T\}$, $i = 1,2$, where $j = 1$, for $i = 1$, $j = 3$ for $i = 2$. It is assumed that the lateral surfaces of $S_T^{(i)}$ satisfy the condition

$$|X_j(t) - X_j(\bar{t})| \leq K|t - \bar{t}|^{(1+\delta)/2}, \quad (1)$$

that the curves $x = X_i(t)$ $(0 \leq t \leq T)$ have no common points for $i = 1,2$ or $i = 3,4$, while they may intersect arbitrarily for $i = 2,3$. The initial conditions read

$$u_i(x,0) = F_i(x), \quad X_j(0) \leq x \leq X_{j+1}(0) \quad (3)$$

$$(j = 1 \text{ for } i = 1\ ;\ j = 3 \text{ for } i = 2).$$

The boundary conditions read

$$\frac{\partial u_i(X_j(t),t)}{\partial x} + \lambda_i(t)u_i(X_j(t),t) = \varphi_i(t), \quad 0 \leq t \leq T \qquad (4)$$

(j = 1 for i = 1 ; j = 4 for i = 2)

The conditions on the lines of discontinuity $x = X_i(t)$, $i = 2,3$, read

$$a_1(t)\frac{\partial u_1(X_2(t),t)}{\partial x} - a_2(t)\frac{\partial u_2(X_3(t),t)}{\partial x} = h(t) \qquad (5)$$

$$u_1(X_2(t),t) - u_2(X_3(t),t) = r(t), \quad 0 \leq t \leq T, \qquad (6)$$

where

$$F_i'(X_j(0)) + \lambda_i(0)F_i(X_j(0)) = \varphi_i(0) \qquad (7)$$

(j = 1 for i = 1 ; j = 4 for i = 2) ,

$$a_1(0)F_1'(X_2(0)) - \alpha_2(0)F_2'(X_3(0)) = h(0) , \tag{8}$$

$$F_1(X_2(0)) - F_2(X_3(0)) = r(0) \tag{9}$$

shall be valid. For the first boundary value problem, one or both conditions (4) corresponding to the second ($\lambda_j(t) \equiv 0$) or third boundary value problem can be replaced by

$$u_i(X_j(t),t) = \Psi_i(t), \quad 0 \leq t \leq T \tag{10}$$

$$(j = 1 \ \text{for} \ i = 1 ; \text{for} \ i = 2 ; j = 4 ,$$

where instead of (7) it is put

$$F_i(X_j(0)) = \Psi_i(0) \tag{11}$$

$$(j = 1 \ \text{for} \ i = 1; j = 4 \ \text{for} \ i = 2).$$

Then the author proves the existence of a solution $u_i(x,t)$ of (2)-(10)

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620320004-4"

27252

On the solution of boundary value ... S/020/61/139/005/002/021
C111/C222

satisfying (2) in $S_T^{(i)}$ and being continuous on $\bar{S}_T^{(i)}$ (closure of $S_T^{(i)}$) together with $\partial u_i/\partial x$ under numerous conditions for the continuity, smoothness and order of growth of the appearing functions and coefficients (the lines of discontinuity are submitted only to the Hölder condition with the exponent $> {}^1/2$).

There are 9 Soviet-bloc and 2 non-Soviet-bloc references.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet imeni M.V. Lomonosova (Moscow State University imeni M.V. Lomonosov)

PRESENTED: April 1, 1961, by S.L. Sobolev, Academician

SUBMITTED: March 31, 1961

Card 5/5

KAMYNIN, L.I.

Solution of a mixed problem for a parabolic equation in dependence on the boundary curves. Dokl. AN SSSR 140 no.6:1244-1247 O '61. (MIRA 14:11)

1. Moskovskiy gosudarstvennyy universitet im. M.V.Lomonosova. Predstavleno akademikom S.L.Sobolevym.
(Boundary value problems) (Differential equations, Linear)

40381

16.3500

S/020/62/145/006/001/015
B112/B104

AUTHOR: Kamynin, L. I.

TITLE: The method of potentials for a parabolic equation with discontinuous coefficients

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 145, no. 6, 1962, 1213-1216

TEXT: For the parabolic equations
$L^{(i)}(u_i) = a_i(x,t)\partial^2 u_i/\partial x^2 + b_i(x,t)\partial u_i/\partial x + c_i(x,t)u_i - \partial u_i/\partial t = f_i(x,t)$
$(i = 1,2)$, the fundamental boundary value-problems and mixed problems with initial data given in an unbounded region are considered. The coefficients a_i, b_i, c_i have first-order discontinuities along the curves $x = X_j(t)$ $(j = 1,2,3)$. The functions $X_j(t)$ satisfy a Hölder condition with respect to t with an exponent which is greater than 1/2. Outside of the lines of discontinuity, the coefficients a_i, b_i, c_i

Card 1/2

38567

16.3500

S/039/62/057/002/003/003
B172/B112

AUTHORS: Kamynin, L. I., and Maslennikova, V. N. (Moscow)

TITLE: Solution of the first boundary value problem for a quasi-linear parabolic equation in non-cylindrical domains

PERIODICAL: Matematicheskiy sbornik, v. 57 (99), no. 2, 1962, 241-264

TEXT: The quasilinear parabolic equation

$$\sum_{i,j=1}^{n} a_{ij}(x,t)\frac{\partial^2 u}{\partial x_i \partial x_j} + \sum_{i=1}^{n} b_i(x,t,u)\frac{\partial u}{\partial x_i} - \frac{\partial u}{\partial t} = f(x,t,u\nabla u) \quad (0.1)$$

is considered in a domain D bounded by hypersurfaces $t = 0$, $t = T > 0$ and a closed surface S which lies between them and has the following properties: S can be overlapped by a finite number of spheres W_j such that the intersection of S and W_j permits a representation

$$x_i = h(x_1, x_2, \ldots, x_{i-1}, x_{i+1}, \ldots, x_n; t)$$

Card 1/2

where the function h and its derivatives satisfy certain Hölder and Lipschitz conditions. The studies made by A. Friedman (Journ. Math. and Mech., 7, nos. 3 and 5 (1958), 9, no. 4 (1960)) in which the linear equation corresponding to equation (0.1) is considered, are continued. Using the $(1 + \delta)$-estimation and Shauder's fixed point theorem for continuous mappings in Banach spaces, the authors prove a series of existence theorems under different conditions for f that are more general than Friedman's results. The barriers introduced by Pogorzelski are used.

SUBMITTED: January 24, 1961

KAMYNIN, L.I.

A problem of hydraulic engineering. Dokl. AN SSSR 143 no.4: 779-781 Ap '62. (MIRA 15:3)

1. Moskovskiy gosudarstvennyy universitet im. M.V.Lomonosova. Predstavleno akademikom S.L.Sobolevym.
(Hydraulic engineering--Problems, exercises, etc.)

KAMYNIN, L. I. (Moskva)

On the existence of a solution to Verigin's problem. Zhur. vych. mat. i mat. fiz. 2 no.5:833-858 S-O '62.
(MIRA 16:1)

(Boundary value problems)
(Differential equations)

KAMYNIN, L.I.

Method of potentials for a parabolic equation with discontinuous coefficients. Dokl.AN SSSR 145 no.6:1213-1216 Ag '62.
(MIRA 15:8)

1. Predstavleno akademikom S.L.Sobolevym.
(Differential equations)

L 11174-63 EWT(d)/FCC(w)/BDS--AFFTC--IJP(C)
ACCESSION NR: AP3001138 S/0199/63/004/003/0582/0610

AUTHOR: Kamynin, L. I.

51

TITLE: On the continuous dependence of the solution of linear boundary problems for a parabolic equation on the boundary 16

SOURCE: Sibirskiy matematicheskiy zhurnal, v. 4, no. 3, 1963, 582-610

TOPIC TAGS: boundary problems, parabolic equations

ABSTRACT: The paper examines the solution of a linear parabolic equation with two independent variables, x and t, which satisfies on a lateral boundary one of the boundary conditions corresponding to the first, second, or third boundary problem. The dependence of this solution on the variation of the curves x = h(t) (for t lying within the interval 0 to T, including both extremes), which prescribe the lateral boundary, is investigated. It is found that the solution u(x,t) and its partial derivative with respect to x depend continuously (in the C metric) on the change (in the Lipshits metric) of the boundary curve, provided the curves are selected from the Lipshits class and the boundary conditions along each of the admissible curves do not change. The coefficients of the parabolic equation can have discontinuities of the first kind along a finite number of curves, on

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L 11174-63
ACCESSION NR: AP3001138

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which specific conditions of conjugation are prescribed (ref. the author's paper in Akad. nauk SSSR. Dokl., v.139, no.5, 1961, 1048-1051); here the solution depends continuously on the discontinuity curves as well, if they are taken from a class of admissible curves. Section 1 of the paper contains auxiliary concepts from the theory of thermal potentials required for the further demonstration. Section 2 demonstrates the continuous dependence on the lateral boundary of the solutions of the classic boundary problems for a parabolic equation with smooth coefficients. Section 3 examines the solutions of boundary problems for a parabolic equation with discontinuous coefficients and demonstrates the continuous dependence of the solution both on the boundary lines and on the discontinuity lines. The analysis employs the methods and results of M.Gevery (J. de Math. pure et appl., no.9, 1913, 305-475). The formulation of the fundamental results of this paper is contained in a brief note by the author in Akad. nauk SSSR, Dokl., v.140, no.6, 1961, 1244-1247. There are 39 numbered equations.

ASSOCIATION: none

SUBMITTED: 23Sep61 DATE ACQD: 01Jul63 ENCL: 00

SUB CODE: MM NO REF SOV: 003 OTHER: 001

Card 2/2 Jb/wm

KAMYNIN, L.I.

Method of thermal potentials for a parabolic equation with discontinuous coefficients. Sib. mat. zhur. 4 no.5:1071-1105 S-O '63. (MIRA 16:12)

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620320004-4"

L 12831-63 EWT(d)/FCC(w)/BDS AFFTC Pg-4 IJP(C)
ACCESSION NR: AP3003214 S/0020/63/150/006/1210/1213 56

AUTHOR: Kamy*nin, L. I.

TITLE: Linear Verigin problem

SOURCE: AN SSSR. Doklady*, v. 150, no. 6, 1963, 1210-1213

TOPIC TAGS: Verigin problem, parabolic equation, free boundary, hydro-construction practice, porous medium

ABSTRACT: Verigin problem for parabolic equations with free boundaries occurs in hydro-construction practice in the study of the pumping process of liquids in a porous medium. The author extends the methods of his previous work (Dan, 143, No. 4, 779, 1962; Zhurn. vy*chislit. matem. i matem fiz., 2, No. 5, 833, 1962) to a study of the Verigin problem for a general linear homogeneous parabolic equation with boundary conditions of the 1st, 2nd and 3rd kind. This report was presented by Academician S. L. Sobolev 12 Jan 63. Orig. art. has: 22 formulas.

ASSOCIATION: Moskovskiy gosudarstvenny*y universitet im. M. V. Lomonosova (Moscow State University)

Card 1/2

KAMYNIN, L.I.; MASLENNIKOVA, V.N.

Boundary estimates of the solution to the third boundary value problem for a parabolic equation. Dokl. AN SSSR 153 no.3:526-529 N '63. (MIRA 17:1)

1. Moskovskiy gosudarstvennyy universitet im. M.V. Lomonosova i Matematicheskiy institut im. V.A. Steklova AN SSSR. Predstavleno akademikom S.L. Sobolevym.

ASSOCIATION: none

SUBMITTED: 27Jan64

SUB CODE: TI, MA

NR REF SOV: 003

ENCL: 00

OTHER: 004

Card 2/2

ACCESSION NR: AP4042859 S/0038/64/028/004/0721/0744

AUTHOR: Kamy*nin, L. I.

TITLE: Existence of a solution of the boundary-value problem for a parabolic equation with discontinuous coefficients

SOURCE: AN SSSR. Izvestiya. Seriya matematicheskaya, v. 28, no. 4, 1964, 721-744

TOPIC TAGS: boundary value problem, parabolic equation, solution existence, one dimensional parabolic equation, Green function, Volterra type equation, integral equation

ABSTRACT: This article presents proofs of the existence of solutions of the first, second, and third boundary-value problems for one-dimensional, second-order parabolic equations with discontinuous coefficients having the same conditions (in domains where they are smooth) as in the classical theory of boundary-value problems for one-dimensional parabolic equations with smooth coefficients. The general second-order parabolic equation is represented by means of the heat

ACCESSION NR: AP4042859

conduction equation, and on the basis of the classical work of Gevrey and Holmgren, the boundary-value problems for this equation are reduced to two simpler auxiliary boundary problems. The first auxiliary problem is reduced to a system of singular Volterra-type integral equations and it is proved that a solution of this system exists. The Green's function for the first auxiliary problem is constructed and serves as the basis for proving, through the method of successive approximations, that the solution of the second auxiliary problem exists. By using certain substitutions, the boundary-value problem for the general parabolic equation with discontinuous coefficients is reduced to the second auxiliary boundary-value problem, for which the existence of the solution is already proved. The orig. art. has: 88 formulas.

ASSOCIATION: none

SUBMITTED: 23Oct61 ATD PRESS: 3085 ENCL: 00

SUB CODE: MA NO REF SOV: 010 OTHER: 002

Card 2/2

L 20812-66 EWT(d) IJP(c)
ACC NR: AP6012029 SOURCE CODE: UR/0020/65/160/003/0527/0529

22

AUTHOR: Kamynin, L. I.; Maslennikova, V. N.

ORG: Moscow State University im. M. V. Lomonosov (Moskovskiy gosudarstvennyy universitet); Mathematics Institute im. V. A. Steklov, AN SSSR (Matematicheskiy institut AN SSSR)

B

TITLE: Boundary evaluations of the solution to a problem involving a directional derivative for a parabolic equation in a non-cylindrical region

SOURCE: AN SSSR. Doklady, v. 160, no. 3, 1965, 527-529

TOPIC TAGS: second order equation, mathematics

ABSTRACT: A parabolic equation of the second kind is considered with given initial and boundary conditions. Evaluations and existence of solutions are given using the methods of I. G. Petrovskiy. This paper was presented by Academician S. L. Sobolev on 30 June 1964. Orig. art. has: 8 formulas. [JPRS]

SUB CODE: 12 / SUBM DATE: 23Jun64 / ORIG REF: 003 / OTH REF: 002

Card 1/1 LJC

KAMYNIN, L.I.

Smoothness of heat potentials. Diff. urav. 1 no.6:799-839 Je '65.
(MIRA 18:7)

1. Moskovskiy gosudarstvennyy universitet imeni M.V. Lomonosova.

L 04179-67

ACC NR: AP6027728 SOURCE CODE: UR/0020/66/169/004/0761/0764

AUTHOR: Kamynin, L. I.

ORG: Moscow State University im. M. V. Lomonosov (Moskovskiy gosudarstvennyy universitet)

27
B

TITLE: A problem of biophysics

SOURCE: AN SSSR. Doklady, v. 169, no. 4, 1966, 761-764

TOPIC TAGS: cell physiology, diffusion equation, biophysics

ABSTRACT: A process associated with the activity of a living cell is visualized as a consequence of a uniquely existing solution of a set of generalized partial differential equations which specifically reduces to a set of diffusion equations describing the cellular process. A cell is describable with a domain $D_T^{(1)}$ (interior of the cell) and its boundary $\Gamma^{(1)}$ (cell surface) immersed in another domain $D_T^{(2)}$ (external environment) and its boundary $\Gamma^{(2)}$ (surface of the environment). Cellular activity is specified by a transport process in which substance k ($k=1,2,\ldots,m$) with concentration $u_{kl}(x,t)$ is subject to intake by the cell, intracellular conversion or exclusion by the cell. The subscript l refers either to interior ($l = 1$) or exterior ($l = 2$) of the cell. $u_{kl}(x,t)$ now satisfy (1)

Card 1/4 UDC: 517.946.9

L 04179-67

ACC NR: AP6027728

$$a_{11}\Delta u_{11}-(c_2+c_3)u_{11}-\partial u_{11}/\partial t=0,\quad a_{21}\Delta u_{21}+c_2u_{11}-\partial u_{21}/\partial t=0,$$
$$(x,t)\in D_T^{(1)},$$
$$a_{k2}\Delta u_{k2}-\partial u_{k2}/\partial t=0\ (k=1,2),\quad (x,t)\in D_T^{(2)} \qquad (1)$$

with boundary conditions (2)

$$(-1)^l a_{kl}\partial u_{kl}(x,t)/\partial N_l(x,t)-h_k(u_{k2}(x,t)-u_{k1}(x,t))=0,$$
$$k,l=1,2,\quad (x,t)\in\Gamma^{(l)}, \qquad (2)$$

which in turn are generalized to a set of parabolic partial differential equations (3)

$$\sum_{i,j=1}^{n} a_{ij}^{(kl)}(x,t)\frac{\partial^2 u_{kl}}{\partial x_i\partial x_j}+\sum_{i=1}^{m}\sum_{j=1}^{n} b_{ij}^{(kl)}(x,t)\frac{\partial u_{il}}{\partial x_j}+\sum_{i=1}^{m} c_i^{(kl)}(x,t)\,u_{il}-$$
$$-\partial u_{kl}/\partial t=f_{kl}(x,t),\ k=1,2,\ldots,m;\ l=1,2,\quad (x,t)\in D_T^{(l)} \qquad (3)$$

with supplementary conditions (4)-(6),

$$u_{kl}(x,0)=f_{kl}^{(1)}(x),\quad x\in\Omega^{(l)}=\overline{D}_T^{(l)}\cap\{t=0\},\quad k=1,2,\ldots,m;\ l=1,2; \qquad (4)$$

$$a_k^{(k)}(x,t)\frac{\partial u_{k2}(x,t)}{\partial \nu_k(x,t)}-b_k^{(k)}(x,t)\,u_{k2}(x,t)=\sum_{i\neq k,\,i=1}^{m}\left(-a_i^{(k)}(x,t)\frac{\partial u_{i2}(x,t)}{\partial \nu_i(x,t)}+\right.$$
$$\left.+b_i^{(k)}(x,t)\,u_{i2}(x,t)\right)+f_k^{(2)}(x,t),\quad (x,t)\in\Gamma^{(2)},\quad k=1,2,\ldots,m; \qquad (5)$$

$$(-1)^l d_{kl}^{(k)}(x,t)\frac{\partial u_{kl}(x,t)}{\partial \nu_{kl}(x,t)}-h_{kl}^{(kl)}(x,t)\,(u_{k2}(x,t)-u_{k1}(x,t))=$$

Card 2/4

$$= \sum_{i=k,\, l=1}^{m} [(-1)^{l+1} d_{il}^{(k)}(x,t) \frac{\partial u_{il}(x,t)}{\partial \nu_{il}(x,t)} + \sum_{j=1}^{2} h_{lj}^{(kl)}(x,t) u_{ij}(x,t)] + f_{kl}^{(3)}(x,t), \quad (6)$$

$$(x,t) \in \Gamma^{(l)}, \quad k = 1, 2, \ldots, m; \; l = 1, 2.$$

respectively, for the $(n+1)$-dimensional Euclidian space $((x)_{n,t})$. With use of the maximum principle and the Vyborny theorem, a unique solution $u_{kl}(x,t)$ of (3)-(6) is obtainable for the particular cases in which (3)-(6) satisfy additional restrictions (7)

$$b_{lj}^{(kl)}(x,t) = c_i^{(kl)}(x,t) \equiv 0 \text{ в } (3), \qquad a_i^{(k)}(x,t) \equiv b_i^{(k)}(x,t) \equiv 0 \text{ в } (5),$$
$$d_{il}^{(k)}(x,t) \equiv h_{lj}^{(kl)}(x,t) \equiv 0 \text{ в } (6) \quad \text{where} \quad i = k+1, \ldots, m. \qquad (7)$$

(in this case $u_{kl}(x,t)$ is continuous on $\bar{D}_T^{(l)}$, or, with further restrictions (8)

$$b_{lj}^{(kl)}(x,t) \equiv 0 \text{ в } (3); \quad a_i^{(k)}(x,t) \equiv 0 \text{ в } (5); \quad d_{il}^{(k)}(x,t) \equiv 0 \text{ в } (6) \quad \text{where} \quad i = 1, 2, \ldots, k-1, \qquad (8)$$

along with (7) (in this case the value of u_{kl} becomes bounded on $D_T^{(l)}$). Application of the analytic continuation method for the $(2+\alpha)$ *a priori* value for the equations (3)-(6) leads to the existence of $u_{kl}(x,t)$ of the class

$$H_{1,\,1,\,(1+\alpha)/2}^{1,\,\alpha,\,\alpha/2}(\dot{D}_T^{(l)}).$$

With further restrictions, the estimated bound for u_{kl} is obtained by (9)

$$|u_{kl}|_{2+\alpha}^{D_T^{(l)}} \leqslant C(D_T^{(l)}, d, d_0, \delta, a_0, M_0, M_1, M_2) \max_{i,j} (|f_{ij}|_{\alpha}^{D_{T}^{(l)}} + |f_{ij}^{(1)}|_{2+\alpha}^{\Omega^{(l)}} + |f_j^{(2)}|_{1+\alpha}^{\Gamma^{(2)}} + |f_{ij}^{(3)}|_{1+\alpha}^{\Gamma^{(1)}} + |u_{ij}|_0^{D_T^{(l)}}). \quad (9)$$

but this estimated value decreases due to the uniqueness of the solution of (3)-(6). Finally, by the special thermal potential theory of Panin, the solution is shown to exist in the class

$$H_{1,L,(1+\alpha/2)}^{1,\alpha,\alpha/2}(\overline{D}_T^{(l)}).$$

Presented by Academician S. L. Sobolev on 1 November 1965. Orig. art. has: 10 formulas.

SUB CODE: 06/ SUBM DATE: 29Oct65/ ORIG REF: 009/ OTH REF: 002

Card 4/4 ZC

ACC NR: AP6036025

SOURCE CODE: UR/0376/66/002/010/1333/1357

AUTHOR: Kamynin, L. I.

ORG: Moscow State University im. M. V. Lomonosov (Moskovskiy gosudarstvennyy universitet)

TITLE: On the evenness of heat potential. 3. Special heat potential of a simple layer $P(x,t)$ on surfaces of the type $Л^{0,1,\frac{1+\alpha}{2}}_{1,\alpha,\alpha/2}$ and $Л^{1,\alpha,\alpha/2}_{1,1,\frac{1+\alpha}{2}}$

SOURCE: Differentsial'nyye uravneniya, v. 2, no. 10, 1966, 1333-1357

TOPIC TAGS: thermodynamics, thermal boundary layer, heat theory, parabolic equation

ABSTRACT: This article is a continuation of a series on heat potentials. Here, the special heat potential $P(x,t)$, introduced by M. Pan'i, is studied. The evenness of the heat potential $P(x,t)$ is investigated as a function of the evenness of its density distributed along the cylindrical surface $Л^{0,1,\frac{1+\alpha}{2}}_{1,\alpha,\alpha/2}$ or $Л^{1,\alpha,\alpha/2}_{1,1,\frac{1+\alpha}{2}}$.

The results achieved in the study are used in proof of the existence of a solution of the class $H^{1,\alpha,\alpha/2}_{1,1,\frac{1+\alpha}{2}}(\overline{D}_T)$ of the II and III boundary problem with a skew derivative for the general linear parabolic second-order equation, with the minimal constraints of evenness from the problem data. The proof of the existence theorem obtains through

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UDC: 517.947.42

ACC NR: AP6036023

application of the method of analytical extension of a parameter. The special thermal potential of the simple layer P(x,t) is mathematically described in terms of its properties. A total of eight theorems is formulated for describing the peculiarities of the evenness of thermal potentials P(x,t) on the surfaces of the type considered. Four of these theorems are rigorously proved, and the proofs of the remaining four are left for inclusion in sections to be published later. The theorems show that, for various statements of the problem, there exists a solution from the class $H^{1,\alpha',\frac{\alpha'}{2}}_{1,1,\frac{1+\alpha'}{2}}(\overline{D_T^+})$. Orig. art. has: 124 equations.

SUB CODE: 20, 12/ SUBM DATE: 02Jul65

Card 2/2

Country : USSR
Category: Soil Science. Mineral Fertilizers. J

Abs Jour: RZhBiol., No 18, 1958, No 82110

Author : Kamynin, M.I.
Inst : [illegible]
Title : Differential Application of Fertilizer in Relation to Soil Conditions.

Orig Pub: Udobreniye i urozhay, 1957, No 9, 34-37.

Abstract: The question of application of fertilizer should be decided on the basis of soil conditions, morphological criteria, agricultural-chemical features, and the level of the harvest of the agricultural crops. Data of the soil investigation characterizing the degree of soil cultivation should be founded on a correct working system

Card : 1/2

USSR / Cultivated Plants. Experimental Methods. M-2

Abs Jour: Ref Zhur-Biol., 1958, No 16, 72861.

Author : Kamynin, M. I.
Inst : Not given.
Title : Methodical Instructions for Investigating the Soil Cover on Experimental Plots in Non-Chernozem Belts.

Orig Pub: Byul. geogr. seti opytov s udobreniyami, 1957, No 1, 30-33.

Abstract: No abstract.

Card 1/1

KAMYNIN, M. I., Cand Agr Sci -- (diss) "Soils of the Oka River Agricultural region of Mos porechya Oblast and their agricultural produce characteristics." Mos, 1958. 19 pp. (All-Union Order of Lenin Acad Agr Sci im V. I. Lenin, All-Union Sci Res Inst of Fertilizers and Agr Soil Sci ~~XXXXX~~ VIUA), 100 copies. (KL, 9-59, 121

SKORNYAKOV, S.M., zasluzhennyy agronom RSFSR; KAMYNIN, M.I., kand.sel'-skokhozyaystvennykh nauk

Utilizing results of soil investigations. Zemledelie 7 no.4:77-84 Ap '59. (MIRA 12:6)

(Soil surveys)

KAMYHIN, Mikhail Il'ich, kand. sel'khoz. nauk; LYAKHOV, Aleksandr Ivanovich, kand. sel'khoz.nauk; KHMEL'NOY, I.G., nauchnyy red.; GLAZUNOVA, N.I., red. izd-va; NAZAROVA, A.S., tekhn. red.

[Soil maps for collective and state farms] Pochvennye karty v kolkhozakh i sovkhozakh. Moskva, Izd-vo "Znanie," Vses. ob-va po rasprostraneniiu polit. i nauchn. znanii, 1961. 37 p. (Narodnyi universitet kul'tury. Sel'skokhoziaistvennyi fakul'tet, no.8)

(MIRA 14:8)

(Soils—Maps)

KAMYNIN, S.M., kand.tekhn.nauk (Moskva)

Excitation control of synchronous machines using absolute angle derivatives. Elektrichestvo no.11:1-4 N '64.

(MIRA 18:2)

VENIKOV, V.A.; KAMYNIN, S.M.; LITKENS, I.V.; TSUKERNIK, L.V.

Automatic excitation controller with strong action for power plants operating in complex electrical systems. Trudy MEI no.54:53-82 '64. (MIRA 17:12)

KAMYNIN, S.M., inzh.

Excitation regulation with consideration of the slippage and acceleration of synchronous machines. Vest. elektroprom. 33 no.3:36-40 Mr '62. (MIRA 15:3)
(Interconnected electric utility systems)
(Electric generators) (Electronic control)

KAMYNIN, S.M.

Electronic phase meter. Izm.tekh. no.7:31-32 Jl '62. (MIRA 15:6)
(Electronic instruments)

KAMYNIN S.S.
KAMYNSKIY, S. S. and E. Z. LYUBIMSKIY

"Automatization of Programming" a paper presented at the Conference on Methods of Development of Soviet Mathematical Machine-Building and Instrument-Building, 12-17 March 1956.

Translation No. 596, 8 Oct 56

KAMYNIN S.S.

KAMYNIN, S. S., LYUBIMSKIY, E. Z., and YERSHOV, Ye. P.

"Automatization of Programming," Trudy tret'yego vsesoyuznogo matematicheskogo s'yezda (Transactions of the Third All-Union Mathematical Congress), 26 Jun-4 Jul 56, Moscow.

KAMYNIN, S. S.

LYUBIMSKIY, E. Z., KAMYNIN, S. S. and SHTARKMAN, V. S.

"Optimum Information Coding in Automation and Multistep Automation Schemes for Production Processes."

Report presented at the Conference on Automation and Computation Engineering, Moscow, 5-8 March 1957. Organized by AU Sci. Eng. and Tech. Society for Apparatus Building.

Math Inst im Steklov, AS USSR

9,7000

S/112/59/000/015/031/068
A052/A002

Translation from: Referativnyy zhurnal, Elektrotekhnika, 1959, No. 15, p. 153,
32053

AUTHORS: Kamynin, S.S., Lyubimskiy, E.Z., Shura-Bura, M.P.

TITLE: Automation of Programming by a Programming Routine

PERIODICAL: V sb.: Probl. kibernetiki, No. 1, Moscow, Gos. izd-vo fiz.-mat. lit., 1958, pp. 135-171

TEXT: Basic information is given on the programming of problem solutions on digital computers. A method of programming by means of generalized commands-operators is described. These command-operators include certain algorithms the representation of which in a form of a sequence of elementary operations can be delegated to the machine itself by a program given once and for ever. The generalized commands-operators are divided into the main and auxiliary ones. To the former belong arithmetic, logical and re-addressing commands-operators; input and preservation commands-operators and a nonstandard command-operator belong to the latter. The task of the programmer consists in giving the arrangement of commands-operators and the information to each of them in form of a line of

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Automation of Programming by a Programming Routine S/112/59/000/015/031/068 A052/A002

numbered symbols corresponding to the type of machine on which the problem will be solved. One of six letters designating in abbreviated form each command-operator can serve as a symbol. A line of symbols and the information to them is the program scheme. The composition of the program proper according to a program scheme can be performed by the machine itself by means of the programming routine. At the same time the algorithm will become more precise: the positions of commands-orders in the storage unit, the addresses of working cells etc will be determined. A description of the "ПП-2" (PP-2) programming routine is given. The conception of conditional numbers is introduced on which, as well as on the conception of an operator scheme, this method of programming automation is based. An instruction for composing programs by means of the PP-2 programming routine is given in an appendix.

A.V.Sh.

Translator's note: This is the full translation of the original Russian abstract.

Card 2/2

L 3458-66 EWT(d)/EWP(1) IJP(c) BB/GG

ACCESSION NR: AP5020296 UR/0208/65/005/004/0699/0708

44,55 44,55 51:681.14 42 B

AUTHORS: Kamynin, S. S. (Moscow); Lyubimskiy, E. Z. (Moscow)

TITLE: Procedure codes in the TA-2 translator

SOURCE: Zhurnal vychislitel'noy matematiki i matematicheskoy fiziki, v. 5, no. 4, 1965, 699-708

TOPIC TAGS: computer, data processing, computer programming, computer compiler, ALGOL language, programming language 16,C,44,55

ABSTRACT: The translation of commands into machine language code by means of a syntax-driven compiler, similar to ALGOL, is discussed. The authors give a brief synopsis of the principle of programming with the use of syntax-driven compilation. Recursive definitions are given for procedure code operator, operator code list, operation code, operation code name, factual operation code variable, break character, and octal number. For example, an octal number is defined syntactically as "an octal digit, or an octal digit followed by an octal number." Details of the manner of storing the translator lists are given. A word length of 45 bits is used, with certain portions of the words reserved for specific purposes. Additional information on required core sizes and addressing methods for list storage are given.

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ACCESSION NR: AP5020296

After storage of the parameter lists, control is transferred to the start of the compiler. Operation codes are analogous ALGOL-60 language and are stored so that the corresponding section of the compiler may be found after completion of the search for an operation code match. Information describing the use of magnetic tape in storing the numeric code equivalents is given. Examples of the use of the translator are shown. Orig. art. has: 3 figures.

ASSOCIATION: none

SUBMITTED: 03Apr65 ENCL: 00 SUB CODE: DP

NO REF SOV: 001 OTHER: 000

BVK

Card 2/2

KAMYNIN, V. I.

Improving calibration processes for powdered-metal bushings.
Mashinostroitel' no.9:16 S '60. (MIRA 13:9)
(Calibration)

NADAREYSHVILI, D.P.; LAVRIK, G.F.; KAMYNIN, V.I.

Work practices of the V.N.Konov brigade in a longwall equipped with a UKR-1 cutter-loader. Ugol' 40 no.3:13-14 Mr '65. (MIRA 18:4)

1. Normativno-issledovatel'skaya stantsiya tresta Krasnoluchugol'.

KAMYNIN, Yu.N.; SHITYREV, N.V.

Automatic control diagram for car haulage in mine surface structures. Ugol' Ukr. 3 no.1:13-16 Ja '59. (MIRA 12:1)
(Mine railroads--Cars) (Automatic control)

KAMYNIN, Yu.N., gornyy inzhener

Use of a microsecond-delay drive for stopping the hoist. Ugol' Ukr. 3 no.12:19-21 D '59. (MIRA 13:4)
(Mine hoisting)

KAMYNIN, Yu.N.

Increasing the operating capacity and improving the safety of automatic coal car change on the surface. Ugol' 36 no.7:24-27 Jl '61. (MIRA 15:2)

1. Luganskiy filial Gosudarstvennogo proyektnogo instituta po avtomatizatsii ugol'noy promyshlennosti.
(Mine haulage) (Automatic control)

KAMYNIN, Yu.N., inzh.

Centralized control station in a mine. Ugol' Ukr. 6 no.2:28 F '62. (MIRA 15:2)

(Coal mines and mining)
(Automatic control)

KAMYNIN, Yu.N., inzh.; SKRIPNIK, G.N., inzh.

Automation of the changing of cars in the shaft bottom. Ugol'.prom. no.3:44-49 My-Je '62. (MIRA 18:3)

1. Luganskiy filial Gosudarstvennogo proyektno-konstruktorskogo instituta avtomatizatsii rabot v ugol'noy promyshlennosti.

KAMYNIN, Yu.N., inzh.; POPOV, V.V., inzh.

Transducers of the contactless equipment for mine automation. Ugol.prom. no.5:56-64 S-O '62. (MIRA 15:11)

1. Luganskiy filial Gosudarstvennogo proyektno-konstruktorskogo instituta avtomatizatsii rabot v ugol'noy promyshlennosti.
(Coal mines and mining—Electronic equipment)

KAMYNIN, Yuliy Nikoalayevich; MATVEYEV, M.G., kand. tekhn. nauk, retsenzent; SEMENENKO, M.D., red.; STARODUB, T.A., tekhn. red.

[Contactless control diagrams in mine automation] Beskontaktnye skhemy upravleniia v shakhtnoi avtomatike. Kiev, Gostekhizdat USSR, 1963. 214 p. (MIRA 17:1)

L 27856-66 EWT(1)/EWA(h)

ACC NR: AP5028467 SOURCE CODE: UR/0286/65/000/020/0040/0040

INVENTOR: Kamynin, Yu. N.; Guts, L. V.; Korolev, V. M.

8
B

ORG: none

15

TITLE: Contactless photorelay. Class 21, No. 175565. [announced by the Lugansk Branch of the "Giprougleavtomatizatsiya" Institute (Luganskiy filial instituta "Giprougleavtomatizatsiya")]

SOURCE: Byulleten' izobreteniy i tovarnykh znakov, no. 20, 1965, 40

TOPIC TAGS: photoelectric relay, contactless relay

ABSTRACT: This Author Certificate introduces a contactless photorelay (see figure) which contains a photocell, a pulse oscillator, storage capacitors, and a trigger section. To increase both the speed and the sensitivity of the relay, it is equipped

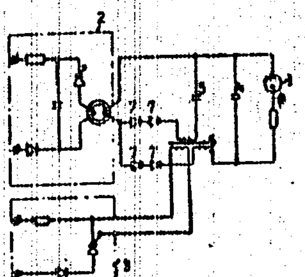

Fig. 1. Contactless photorelay

1 - Photocell; 2 - pulse generator; 3 - trigger section; 4 and 5 - storage capacitors; 6 - pulse transformer; 7 - diodes.

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L 27856-66

ACC NR: AP5028467

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with 1) two storage capacitors, one of which is connected across the photocell, and, 2) a current comparison element in the form of a pulse transformer. One of the three windings of the transformer is connected to the trigger section, and the other two are connected through diodes and storage capacitors to the pulse oscillator. Orig. art. has: 1 figure. [JR]

SUB CODE: 09/ SUBM DATE: 06Aug64/ ATD PRESS: 4165

Card 2/2 So

KAMYNSKI, Wlodzimierz, Dr.

Tasks of the Polish food industry. Elelm ipar 13 no.12:382-385 D '59.

1. A Lengyel Elelmiszeripari es Begyujtesi Miniszterium Tervgazdasagi Foosztalyanak vezetoje.

KAMYNSKI, Wlodzimierz, Dr.

Tasks of the Polish food industry. Elelm ipar 13 no.12: 382-385 D '59.

1. Lengyel Elelmiszeripari es Begyujtesi Miniszterium Tervgazdasagi Foosztalya vezetoje.

KAMYRIN, V.I., inzh.; REVZIN, B.S., inzh.

Decreasing pressure losses in control valves of high-pressure turbines. Energomashinostroenie 5 no.1:46 Ja '59.
(MIRA 12:2)

(Valves)

87944

S/094/61/000/001/004/007
E073/E335

26.2194

AUTHORS: Kamyrin, V.I., Kolodochko, S.A., Revzin, B.S. and Smagin, Yu.A.

TITLE: Reducing the Hydraulic Losses in Regulating Valves of High-pressure Turbines

PERIODICAL: Promyshlennaya energetika, 1961, No. 1, pp. 15 - 16

TEXT: In a number of turbines produced by the Leningradsiy metallicheskiy zavod (Leningrad Metallurgical Works) and operating at high parameters, increased losses in steam pressure occurred in the control valves of the live steam, amounting to 12-15 kg/cm^2 instead of the 3-3.5 kg/cm^2 estimated in calculations. These losses are particularly great in the top control valves (I and III) of the turbines of types ВК-100-2 (VK-100-2), ВК-50-1 (VK-50-1), ВТ-25-4 (VT-25-4), etc. The authors found that the basic cause of this is the formation of a general circular vortex - a circulatory motion of the steam about the valve axis.
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S/094/61/000/001/004/007
E073/E335

Reducing the Hydraulic Losses in Regulating Valves of High-pressure Turbines

To eliminate this phenomenon the authors proposed welding a divider (Fig. 1) into the valve housing, as shown in Fig. 2, and fitting a protective grid at the side of the steam inflow into the housing, so as to reduce the dynamic effect of the steam inflow into the diffuser seat. As a result of introducing this measure a fuel economy of 600-900 tons per turbine per annum was achieved.
This suggestion was awarded third prize in the Fifteenth All-Union Competition on Energy Saving.
Note: this is a complete translation.

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E073/E335

Reducing the Hydraulic Losses in Regulating Valves of High-pressure Turbines

Fig. 1:

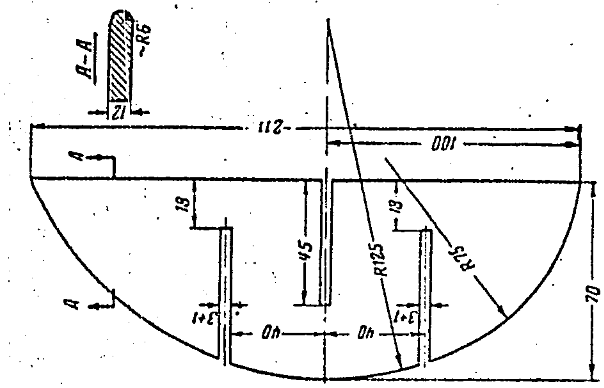

Рис. 1. Варной разделитель.

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Reducing the Hydraulic Losses in Regulating Valves of High-pressure Turbines

Fig. 2:

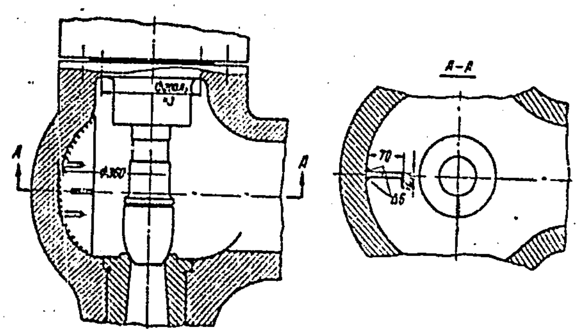

Рис. 2. Установка парного разделителя в паровой коробке клапана.

There are 2 figures.
Card 4/4

86469

26.2120

S/096/61/000/001/005/014
E194/E184

AUTHOR: Kamyrin, V.I., Engineer

TITLE: The Combined Operation of a Turbine Stage and the Adjacent Inlet or Exhaust Unions

PERIODICAL: Teploenergetika, 1961, No. 1, pp. 37-44

TEXT: The flow of gas through the inlet or exhaust unions of a turbine is asymmetrical and, therefore, the resistance of the union differs in different places. The flow of gas through the exhaust union of a turbine is illustrated schematically in Fig. 1 and the resistance varies because the exhaust is in one direction only whilst gas leaves the runner all round its circumference. Combined operation of an active type turbine stage with a small degree of reaction and an exhaust union is then considered. The stage is considered to operate in the sub-critical region and it is assumed that the speed is everywhere less than that of sound. An expression is then written for the speed at which the gas leaves the nozzle box expressed in terms of the heat drop in the stage. A number of equations are derived from which it is concluded that changes in the elementary flow over the annular area of the stage

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E194/E184

The Combined Operation of a Turbine Stage and the Adjacent Inlet or Exhaust Unions

depend on a number of factors including the characteristics of the exhaust union (or the coefficient of variation of resistance), the design characteristics of the stage, the velocity factor, the mean reaction of the stage, and others. In order to elucidate the influence of each of these factors on the variations in the exhaust speed of the gas from the stage, Fig.2 shows calculated curves of the change in relative velocity of flow from the turbine stage as function of the coefficient of variation of resistance of the inlet and exhaust unions. From analysis of the curves of Fig.2 it is found that variations in velocity depend little on the operating conditions of the stage. Most of the considerations also apply when the gas issues from the nozzles at a speed greater than that of sound. The combined operation of the exhaust union and a turbine stage of the reaction type is then considered in the same way as before and comparable equations are derived. It is found that the change in the velocity of flow of steam from the runner blades in the case of a reaction stage considered together with the

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exhaust union depends on the following characteristics: the coefficient of variation of resistance of the exhaust union; the velocity coefficients; the stage reaction; and certain design factors of the stage. In order to analyse the influence of these factors, calculated graphs of change in relative velocity of flow from the turbine stage as function of the coefficient of variation of resistance of the exhaust union are shown in Fig.3. It is seen that the design coefficient of the stage has a fundamental influence on the degree of variation of outflow of gas from the stage in the case of a reactive stage, whilst the influence of the operating conditions and of the degree of reaction are relatively unimportant. The formulae that are derived may be applied if there is critical flow in the nozzles or runner blades provided that certain allowances are made. Combined operation of a turbine stage of the active type and the inlet union is then considered and formulae are derived in much the same way as before. For the purposes of tests models were made of the inlet and exhaust unions

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The Combined Operation of a Turbine Stage and the Adjacent Inlet or Exhaust Unions

to give similar flows in the model and in the full-scale machine. The criteria of similarity are briefly discussed. The model of the inlet union is quite easily tested together with the model of the nozzle box but at first sight it appears possible to test a model of the exhaust union only in conjunction with a rotating model of the stage. However, there are several possibilities for testing the exhaust union without a rotating stage whilst approximately maintaining the conditions of kinematic similarity between full-scale object and model. One such method is to instal a close grid in the inlet to the union, and Fig.4 shows a diagram of a model of an exhaust union. The construction is briefly described. It is shown that if the variations in static pressure or the variation in resistance coefficient are known at the inlet to the union and the corresponding changes in speed in the inlet section of the union are known, the density of the grid at any point may be determined. Another method of testing exhaust unions under static conditions whilst maintaining kinematic

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The Combined Operation of a Turbine Stage and the Adjacent Inlet or Exhaust Unions

similarity consists in individually adjusting the delivery of gas to each unit of inlet section of the union by the use of suitable barriers. Fig.5 shows a graph of changes in the resistance coefficient referred to the mean dynamic head during tests on an exhaust union without an inlet grid (curves 1 and 2) and with a grid (curves 3 and 4). It is shown that the resistance of the union may be reduced by suitable arrangements and similar results were obtained during tests of the inlet union of a compressor. It is concluded that the theoretical conclusions concerning the maintenance of conditions of kinematic flow in the control section of models of inlet and exhaust unions permit practical confirmation since by maintaining conditions of kinematic similarity in model tests of unions their resistance may be determined accurately and also the distribution of flow velocity in the union.
There are 5 figures and 3 Soviet references.

ASSOCIATION: Kaluzhskiy turbinnyy zavod (Kaluga Turbine Works)

Card 5/5

KAMYSHAN, Aleksandr Pavlovich [Komyshan, O.P.]; GRECHKO, G.S. Hrechko, H.S.], red.; LIMANOVA, M.I. [Lymanova, M.I.], tekhn. red.

[Wide-spread sowing of certified potatoes] Sutsil'ni sortovi posivy kartopli. Kharkiv, Kharkivs'ke knyzhkove vyd-vo, 1963. 19 p. (MIRA 17:1)

1. Direktor sovkhoza "Berezivka", Kharkovskogo tresta ovoshchno-molochnykh sovkhozov (for Kamyshan).

OMEL'CHENKO, F.S., kand. tekhn. nauk; KAMYSHAN, M.A., inzh.

Determining saponifiable matter content of industrial monoethanolamides. Masl.-zhir. prom. 29 no.5:19-21 My '63. (MIRA 16:7)

1. Krasnodarskiy institut pishchevoy promyshlennosti.
(Acids, Fatty) (Cleaning compounds)

PAVLOV, G.M.; KAMYSHAN, M.A.

Methods for determining the composition of the industrial monoethanolamides of fatty acids. Izv. vys. ucheb. zav.; pishch. tekh. no.2:163-166 '63. (MIRA 16:5)

1. Krasnodarskiy institut pishchevoy promyshlennosti, kafedra tekhnologii zhirov.
(Ethanol—Analysis) (Acids, Fatty)

KAMYSHAN, M.A.; PAVLOV, G.M.

Kinetics of the amination of fatty acids by monoethanolamine.
Izv. vys. ucheb. zav.; pishch. tekh. no.4:61-64 '63.
(MIRA 16:11)

1. Krasnodarskiy institut pishchevoy promyshlennosti,
kafedra tekhnologii zhirov.

OMEL'CHENKO, F.S., kand.tekhn.nauk; KAMYSHAN, M.A., inzh.

Kinetics of the amidation of fatty acids with monoethanolamine. Masl.-zhir.prom. 29 no.11:26-28 N '63. (MIRA 16:12)

1. Krasnodarskiy institut pishchevoy promyshlennosti.

KAMYSHAN, V.P.; MIGACHEVA, Ye.Ye.

Boundary of the Aalen and Bajocian stages in the Urup-Bizhgon Basin. Trudy Geol. muz. AN SSSR no.14:92-98 '63. (MIRA 17:11)

KAMYSHAN, V.P.; BABANOVA, L.I.

Find of Lower Jurassic limestone boulders near Karadag (Crimea).
Dokl.AN SSSR 145 no.2:384-385 Jl '62. (MIRA 15:7)

1. Khar'kovskiy gosudarstvennyy universitet imeni A.M.Gor'kogo.
Predstavleno akademikom D.V.Nalivkinym.
(Karadag region (Crimea)--Geology, Stratigraphic)

Card 3/3

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000620320004-4"

ACC NR: AP5025893 WW/GG SOURCE CODE: UR/0057/65/035/010/1806/1816

44,55 44,55 44,55

AUTHOR: Dyubko, S.F.; Kamyshan, V.V.; Sheyko, V.P.

44,55

ORG: Khar'kov State University im. A.M.Gor'kiy (Khar'kovskiy gosudarstvennyy universitet)

96 90 B

TITLE: On the instability of confocal systems

SOURCE: Zhurnal tekhnicheskoy fiziki, v. 35, no. 10, 1965, 1806-1816

21,44,55 ,55 21,44,55

TOPIC TAGS: resonator, laser, electromagnetic wave diffraction

ABSTRACT: The power losses of open square resonators with apertures from 10 to 18.2 wavelengths and radii of curvature from 45 to 52 wavelengths were measured as functions of the distance between the reflectors. Coupling to the resonator was provided by small openings in the centers of the reflectors. Microwave power was produced with a thermostated klystron supplied from regulated rectifier. Batteries were employed for cathode heating current and the reflector and focusing potentials, and pulling of the oscillator frequency by the resonator was suppressed by a directional coupler providing 25 db of decoupling. A frequency stability of one part per million was achieved. The klystron output was amplitude modulated at audio frequency and the signal was amplified after detection with a narrow-band audio amplifier. Curves are presented showing the envelopes of the amplitudes of the TEM_{00}, TEM_{01}, TEM_{02}, TEM_{03},

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and TEM_{04} modes. These curves show complex structure with numerous minima, and there is a particularly pronounced minimum at the separation at which the reflectors are confocal. This minimum is ascribed to coupling due to imperfections of the reflectors between the various modes that degenerate under confocal conditions, as a result of which energy escapes into the higher modes where diffraction losses are large. Amplitude and phase distributions on the reflectors were calculated with the aid of the integral equation of A.G.Fox and T. Li (BSTJ, 40, 453, 1961) and the results are presented graphically and discussed briefly. It is concluded that the requirement that the reflectors be confocal, sometimes specified with close tolerance in laser design, is not only unnecessary but even disadvantageous. The authors thank Professor R.A.Valitov for his interest in the work and E.D.Sitnikov for his assistance with the calculations. Orig. art. has: 2 formulas and 6 figures. 44,55

SUB CODE: EC, EM, OP/ SUBM DATE: 12Nov64/ ORIG REF: 006/ OTH REF: 006

Card 2/2

IVANOV, A.Ya., prof., otv.red.; AGRANOVSKIY, Z.M., prof., red.; ANDREYEVA-GALANINA, Ye.TS., prof., red.; ANICHKOV, S.V., prof., red.; BABAYANTS, R.A., prof., red.; BASHENIN, V.A., prof., red.; GUTKIN, A.Ya., prof., red.; KAMYSHANOV, A.F., dotsent, red.; KLIONSKIY, Ye.Ye., prof., red.; RYSS, S.M., prof., red.; SMIRNOV, A.V., prof., zasluzhennyy deyatel' nauki, red.; TIKHOMIROV, P.Ye., prof., red.; CHISTOVICH, G.N., prof., red.

[New informative material on the methodology for sanitation of the environment, and the prevention, diagnosis and treatment of some diseases; results of research at the Leningrad Medical Institute of Sanitation and Hygiene to assist in the practice of public health] Novye informatsionnye material po metodike ozdorovleniia vneshnei sredy, preduprezhdeniiu, diagnostike i lecheniiu nekotorykh zabolevanii; rezul'taty nauchnykh issledovanii LSGMI v pomoshch' praktike zdravookhraneniia. Leningrad, 1961. 105 p. (Leningrad. Sanitarno-gigienicheskii meditsinskii institut. Trudy, vol.73). (MIRA 17:3)

1. Deystvitel'nyy chlen AMN SSSR (for Anichkov). 2. Chleny-korrespondenty AMN SSSR (for Babayants, Ryss).

KONSTANTINOV, A.N., SUKHOTSKIY, M.L., SUKACHEV, V.V., KAMYSHANOV, G.I., TSARENKO, A.P., red.; KHITROV, P.A., tekhn.red.

[Advanced work methods for passenger service personnel] Peredovye metody truda passazhirskikh rabotnikov. Moskva, Gos.transp. zhel-dor. izd-vo, 1958. 91 p. (MIRA 11:7)

(Railroads--Employees)
(Railroads--Passenger traffic)

KAMYSHANOV, P.; KAPITONOV, M.

Simplified accounting in wholesale enterprises. Sov.torg. no.2: 41-43 F '57. (MLRA 10:2)
(Wholesale trade--Accounting)

KAMYSHANOV, P.

Simplification of accounting in wholesale enterprises. Sov. torg. no.9:23-27 S '58. (MIRA 11:9)

(Wholesale trade--Accounting)